IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Re:	Application of:	Pierre BARBERIS et al.
	Serial No.:	10/541,774
	Filed:	July 7, 2005
	For:	METHOD OF PRODUCING A ZIRCONIUM ALLOY SEMI-FINISHED PRODUCT FOR THE PRODUCTION OF AN ELONGATED PRODUCT AND USE THEREOF
	Art Unit:	1793
	Examiner:	Mark L. Shevin

Mail Stop: APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 7, 2009

APPELLANT'S BRIEF UNDER 37 C.F.R. § 41.37

Sir:

Appellants submit this brief for the consideration of the Board of Patent Appeals and Interferences (the "Board") in support of their appeal of the Final Rejection dated July 7, 2009 in this application. The statutory fee of $540.00 is submitted concurrently herewith. If any additional fees are deemed to be due at this time, the Assistant Commissioner is authorized to charge payment of the same to Deposit Account No. 50-0552.

1. REAL PARTY IN INTEREST

The real party in interest is Compagnie Europeene du Zirconium-Cezus, a French corporation having a place of business in Paris, France, and the assignee of the entire right, title and interest in the above-identified patent application. The invention was assigned to Compagnie Europeenne du Zirconium-CEZUS by an assignment originating from inventors Pierre Barberis, Joseph Noel Rizzi and Xavier Robbe. The most recent conveyance was recorded on July 7, 2005 at reel 017447, frame 0129.

2. RELATED APPEALS AND INTERFERENCES

Appellants, their legal representatives, and assignee are not aware of any appeal or interference that directly affects, will be directly affected by, or will have a bearing on the Board's decision in this appeal.

3. STATUS OF CLAIMS

Claims 1 to 20 are pending in the application. Claims 1 to 10 are canceled. Claims 11 to 20 were rejected in the Final Office Action dated July 7, 2009.

The rejections to claims 11 to 20 thus are appealed. A copy of appealed claims 11 to 20 is attached hereto as Appendix A.

4. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the July 7, 2009 Final Office Action.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent claim 11 recites a method for producing a zirconium alloy semi-finished product containing by weight at least 97% zirconium, intended for the production of at least one elongated product, comprising:

casting the zirconium alloy to produce an ingot with a diameter between 400 mm and 700 mm and a length between 2 m and 3 m (for example, Substitute Specification page 5, lines 20 to 23; for example, cast ingot 1 in Figure 1); two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product (for example, Substitute Specification page 7, lines 18 to 24; for example, first forging stage 2 and second forging stage 4 in Figure 1), wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy (for example, Substitute Specification page 7, lines 18 to 20; for example, first forging stage 2 in Figure 1), wherein a second forging stage follows the first forging stage, wherein β quenching does not occur between the first and second forging stage (for example, Substitute Specification page 7, lines 18 to 24; for example, first forging stage 2 and second forging stage 4 in Figure 1); and extruding or hot rolling the forged ingot (for example, Substitute Specification page 7, lines 20 to 24).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 11 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over EP Patent No. 0085553 to Sabol (hereinafter "Sabol") in view of U.S. Patent No. 5,835,550 to Van Swam (hereinafter "Van Swam").

7. ARGUMENTS

B. 35 U.S.C. §103(a) Rejections

Claims 11 to 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sabol in view of Van Swam.

Sabol et al. discloses "zirconium alloy intermediate and final products, and processes for their fabrication." (Page 1, lines 1 to 3).

Van Swam discloses "a process for fabricating [a] nuclear fuel rod cladding tube comprising β quenching a zirconium alloy billet." (See Abstract). The process includes "heating

to a temperature in the beta range greater than about 1000°C. and rapidly quenching the billet to a temperature below the α plus β transformation temperature to form a martensitic structure; extruding the beta-quenched billet at a temperature between 600°C. and 750°C. to form a hollow; annealing the hollow by heating at a temperature up to about 700°C.; pilgering the annealed hollow; and final annealing the pilgered annealed hollow to a temperature up to about 700°C. to form a nuclear fuel rod cladding tube." (See Abstract).

Claim 11 recites "a method for producing a zirconium alloy semi-finished product containing by weight at least 97% zirconium, intended for the production of at least one elongated product, comprising:

casting the zirconium alloy to produce an ingot with a diameter between 400 mm and 700 mm and a length between 2 m and 3 m;

two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product, wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy, wherein a second forging stage follows the first forging stage, wherein β quenching does not occur between the first and second forging stage; and

extruding or hot rolling the forged ingot."

As admitted in the Office Action on page 3, Sabol et al. does not teach or show the limitation "wherein β quenching does not occur between the first and second forging stage" required by claim 11. However, the Office Action contradicts itself on page 7 and asserts that Sabol "does not require beta quenching." The latter is incorrect. Sabol clearly teaches β quenching. "The intermediate billet is then beta solution treated by heating above the alpha + beta/beta transus temperature and then held in the beta phase for a specified period of time and then quenched in water." (Sabol page 2, lines 12 to 16). Heating and holding a product above the $\alpha + \beta \rightarrow \beta$ transus temperature and quenching it with water is the precise definition of β quenching. Sabol β quenches after the initial forging. (See page 2, line 11 to 16). Van Swam fails to meet this limitation as well. The forging of Van Swam is performed only in combination with a treatment which always includes β quenching. The passage of Van Swam cited by the Office Action, clearly teaches β quenching following the α or α + β forging. Van Swam clearly teaches β quenching following the α , α + β forging. (See col. 8, line 63 to col. 9, line 3).

Furthermore, the intermediate β quenching and Sabol's second forging process identified in the Office Action would not be suitable for ingots of the claimed size and it is respectfully submitted that one of skill in the art would never use Sabol's second forging process with such ingots due to the undesirable formation of hydrides. The intermediate quenching of Sabol would imply a long reheating at a high temperature similar to the one which takes place in the prior art referenced in the specification, for bringing the ingot to a 1,000° to 1,100° C, which would cause the formation of the undesirable hydrides in an amount that would not be negligible for ingots of the claimed size. Also, hydrides may be formed during the quenching itself, due to contact of the hot product with water, also in an amount that would not be negligible for ingots of the claimed size.

Withdrawal of the rejections to claim 11 and the dependent claims 12 to 20 under 35 U.S.C. § 103(a) as being unpatentable over Sabol et al. in view of Van Swam is respectfully requested.

Claim 12 to 15 Argued Separately

Furthermore, with regards to claims 12 to 15, neither Sabol nor Van Swam teach such volume limitations of claim 12 or the temperature limitations of claims 13 to 15. The Office Action asserts these limitations can be easily optimized through routine optimization however, this is not true. Both Sabol and Van Swam teach β quenching following forging, unlike the present invention "wherein β quenching does not occur between the first and second forging stage." It would not be routine optimization to determine the volume limitations of claim 12 and the temperature limitations of claims 13 to 15, when the process steps are different – with and without β quenching. As discussed above, the steps taught in Sabol and Van Swam cause the formation of undesirable hydrides.

For this additional reason, withdrawal of the rejection of dependent claims 12 to 15 is respectfully requested.

CONCLUSION

It is respectfully submitted that the application is in condition for allowance. Favorable consideration of this appeal brief is respectfully requested.

Respectfully submitted,

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DATED: December 7, 2009

By: _____

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APPENDIX A:

PENDING CLAIMS 11 to 20 OF U.S.
APPLICATION SERIAL NO. 10/541,774

Claim 11 (previously presented): A method for producing a zirconium alloy semi-finished product containing by weight at least 97% zirconium, intended for the production of at least one elongated product, comprising:

casting the zirconium alloy to produce an ingot with a diameter between 400 mm and 700 mm and a length between 2 m and 3 m;

two-stage forging the ingot to produce the semi-finished product intended to be formed to obtain the elongated product, wherein a first forging stage of the ingot is performed at a temperature at which the zirconium alloy is in a state comprising the crystalline α and β phases of the zirconium alloy, wherein a second forging stage follows the first forging stage, wherein β quenching does not occur between the first and second forging stage; and

extruding or hot rolling the forged ingot.

Claim 12 (previously presented): The method according to claim 11, wherein at the temperature of the first forging stage, the ingot contains a volume proportion of zirconium alloy in the α phase between 10% and 90%, a remainder of the zirconium alloy of the ingot being in the β phase.

Claim 13 (previously presented): The method according to claim 11, wherein the first forging stage is performed at a temperature between 850°C and 950°C.

Claim 14 (previously presented): The method according to claim 13, wherein the first forging stage is performed at a temperature of approximately 900°C.

Claim 15 (previously presented): The method according to claim 11, wherein the first forging stage is performed at a temperature between 600°C and 950°C.

Claim 16 (previously presented): The method according to claim 11, further comprising:

performing the second forging stage at a temperature at which the zirconium alloy of an intermediate product obtained by the first forging stage of the ingot is in the α phase.

Claim 17 (previously presented): The method as claimed in 11, wherein a second forging stage is performed at a temperature at which the zirconium alloy of an intermediate product obtained at an end of the first forging stage of the ingot is in a state comprising crystalline α and β phases of zirconium alloy.

Claim 18 (previously presented): The method according to claim 11, wherein the zirconium alloy contains at most 3 % by weight in total of additive elements comprising at least one of tin, iron, chromium, nickel, oxygen, niobium, vanadium and silicon, a remainder of the alloy being constituted by zirconium with an exception of the inevitable impurities.

Claim 19 (previously presented): The method according to claim 11 further comprising:

producing a semi-finished product intended for the production of a tubular product for manufacture of a fuel assembly element for one of a fuel assembly for a water-cooled nuclear reactor and a fuel assembly element for a CANDU reactor.

Claim 20 (previously presented): The method according to claim 11 further comprising:

producing a bar intended for production of a small diameter plug bar for manufacture of plugs closing ends of jacket tubes of fuel assembly rods for nuclear reactors.

APPENDIX B

Evidence Appendix under 37 C.F.R. §41.37(c)(ix):

No evidence pursuant to 37 C.F.R. §§1.130, 1.131 or 1.132 and relied upon in the appeal has been submitted by appellants or entered by the examiner.

APPENDIX C

Related proceedings appendix under 37 C.F.R. §41.37(c)(x):

As stated in "2. RELATED APPEALS AND INTERFERENCES" of this appeal brief, appellants, their legal representatives, and assignee are not aware of any appeal or interference that directly affects, will be directly affected by, or will have a bearing on the Board's decision in this appeal.